BOSTON COMMON. PARK AND TREMONT STS., LOOKING SOUTHERLY, SEPT. 1, 1897.

History of Act Creating Boston Transit Commission

The Rapid Transit Commission (under legislative authority) was appointed in June, 1891, to deal with the whole problem of Rapid Transit to, and in, Boston.

That Commission Consisted of Mayor Matthews, City Engineer William Jackson, *ex-officiis;* John Quincy Adams, Chester W. Kingsley, Osborne Howes, Jr., Henry L. Higginson, James B. Richardson and John E. Fitzgerald.

Fifty-one Public Hearings were given, and it employed numerous engineers and experts, and the cost of its investigations amounted to $50,000.

The Board of Subway Commissioners was appointed on January 1, 1894 (by Act of Legislature of 1893), and consisted of Charles H. Dalton, Thomas J. Gargan and George F. Swain, with authority to construct a subway or subways from a point or points near Tremont and Pleasant streets to an exit in Scollay square or vicinity.

This Committee's Report to the Legislature on February 12, 1894, called attention to certain defects in the Act of 1893.

A Joint Special Committee on Transit consisting of fifteen members was later appointed and it gave twenty-eight hearings in all. This Committee endorsed the recommendations of the Subway Commission and incorporated them with their own, in a composite act, the first half of which provided for the incorporation of the Boston Elevated Railway Company, and the last half, for the creation of the Boston Transit Commission.

The Two Parts of This Composite Act had no necessary connection with each other, viz:— The building of the Elevated Railroad was not made dependent upon the building of the Subway, and vice versa.

Gov. Frederick T. Greenhalge.

The Boston Transit Commission

Act Creating the Boston Transit Commission approved by Gov. Frederick T. Greenhalge, July 2, 1894.

Legislative Act Accepted by the people of Boston at a general election, July 24, 1894.

Amendatory Bill Approved by Gov. Greenhalge, June 21, 1895.

Act Declared Constitutional by the Supreme Court June 15, 1896.

GEORCE G. CROCKER, Chairman	Appointed by Gov. Greenhalge
CHARLES H. DALTON	Appointed by Mayor Nathan Matthews, Jr.
THOMAS J. GARGAN	Appointed by Mayor Matthews
GEORGE F. SWAIN	Appointed by Mayor Matthews
ALBERT C. BURRAGE	Appointed by Gov. Greenhalge
HORACE G. ALLEN (vice Burrage, resigned)	Appointed by Acting-Gov. Wolcott (1896)
B. LEIGHTON BEAL, Secretary	
HOWARD A. CARSON, Chief Engineer	

Members of the Commission appointed for five years; salary, $5,000 each.

The Merits of a Subway

First. The Subway destroys but little property. The widening of streets renders necessary the destruction of much property.

Second. The Subway eliminates the danger which pedestrians now encounter in crossing tracks.

Third. The Subway increases traffic capacity by removing from the surface one important class of traffic.

Fourth. The Subway relieves the streets from the posts and net work of wires necessary in the overhead trolley system.

Fifth. The Subway relieves the streets of the noise of the street car, the rumble and jar of the wheels, the hum of the motor and the clang of the bell.

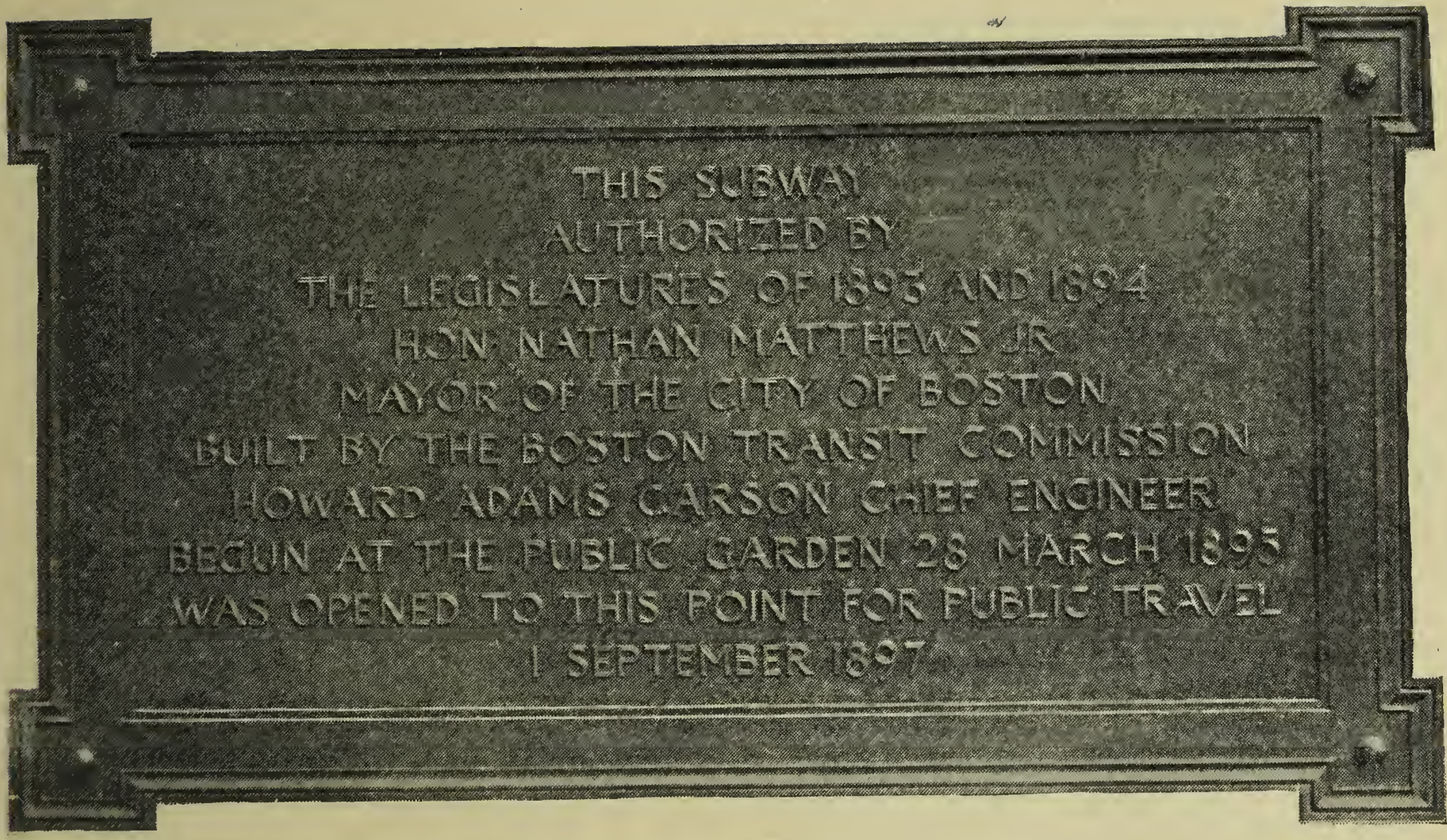
Sixth. The Subway renders it possible to run cars between stations at speed and with safety.

Seventh. In the Subway it is possible, by the use of a sub-subway, to avoid the crossing of one track at grade by another track

Eighth. The Subway increases several fold the capacity for street-car traffic through the city.

Ninth. The Subway is preferable in stormy weather, or in excess of cold or heat. In the Subway the tracks are not subjected to obstruction by snow and ice.

Tenth. On account of the fewer stops and the better track, the power required in moving cars is less than in moving them on the surface.



Bronze Tablet above Stairways, Park Street Entrance.

Cost of the Subway

Although the Transit Commission was authorized to place $7,000,000 bonds to cover the cost of the entire Subway, but $4,500,000 of these bonds were offered for sale, and by the careful supervision of the work on the part of the Commission, the entire cost did not exceed $4,250,000. This includes ventilating and pump chambers; changes of water and gas pipes, sewers and other structures; administration, engineering, interest on bonds, and all costs. The approximate total cost of pipe relocations, except sewers, built as part of day or contract work on subway sections is as follows:—Sewers, $32,050; water pipes, $66,200; gas pipes, $31,170; electric conduits, $12,800; total, $142,220.

Annual Estimated Compensation

It is estimated that the compensation to be paid annually, being 4⅞ per cent of the net cost of the Subway, will be sufficient to meet the annual interest on the sinking fund requirements of the bonds which have been issued for the construction of the Subway. Those bonds run for a term of forty years. Some of them are 4 per cent bonds and some are 3½ per cent bonds and they have been issued at various premiums which premiums have been paid into the sinking fund.

The Average Rate at which the money for the construction of the Subway has thus far been borrowed by the City is less than 3½ per cent, leaving about 1⅜ per cent to provide for sinking fund requirements.

[First Excavations, Boylston and Charles Streets, March, 1895.

Work on the Subway

Was begun on March 28, 1895, at the Public Garden, in the presence of His Excellency the Governor, Frederick T. Greenhalge, and the members of the Boston Transit Commission. The work of construction covered a period of three years, four months and eighteen days. The Act required "That all streets and places under or near which a subway is constructed shall be open for traffic between 8 o'clock in the forenoon and 6 o'clock in the afternoon." This requirement was complied with.

Excavations Near Buildings. The Boston Subway goes near to, and much below, some of Boston's buildings. For instance, the excavation was within seven feet of and about eighteen feet below the foundation of the Hotel Pelham, which is a seven story stone building. The Subway is less than three feet from the front of, and about twenty-four feet below, the foundation of the four story brick building numbered 285 to 291 Tremont street.

Removing Buildings on Triangle. The contract for this was signed March 31, 1896; work was done May 15, 1896. Six brick buildings from two to five stories high and nine frame buildings, from one to three stories high, were removed above foundations.

Plans. Eleven Hundred and twenty plans were made during the year ending August 15, 1897,

Removal of Statues. The Statue of John Winthrop, in Scollay Square, being over a part of the permanent work of the Subway, was removed to a new permanent location, approved by the Mayor, about thirty-five feet north-easterly from its original position. The work of removal was done by O. A. and G. A. Trumbull.

The Statue of Samuel Adams in Adams Square was removed about five feet to the north and, two and one-half feet to the west, in order to make room for the side-walls. This work was done by John Cavanaugh & Sons and the new position of the statue was approved by the Mayor.

Work on Section Three, looking Northerly, May 14, 1896.

Construction of the Subway

First ground broken, by Chairman Crocker, on the Public Garden, near the corner of Boylston and Charles streets, March 28, 1895.

Section 1—From the Public Garden, opposite Church street, to the corner of Boylston and Tremont streets (two tracks), and from a point nearly opposite Mason street to West street, under the Common (four tracks); constructed by Jones & Meehan of Boston.

Section 2—From the corner of Boylston and Tremont streets to a point nearly opposite Mason street, under the Common (four tracks); constructed by E. W. Everson of Providence.

Section 3—From West street to Park street, under the Common and partly under Tremont street (four tracks); constructed by F. E. Shaw of Providence.

Section 3½—Under Tremont street, from Park street to opposite Hamilton place; constructed by E. W. Everson of Providence.

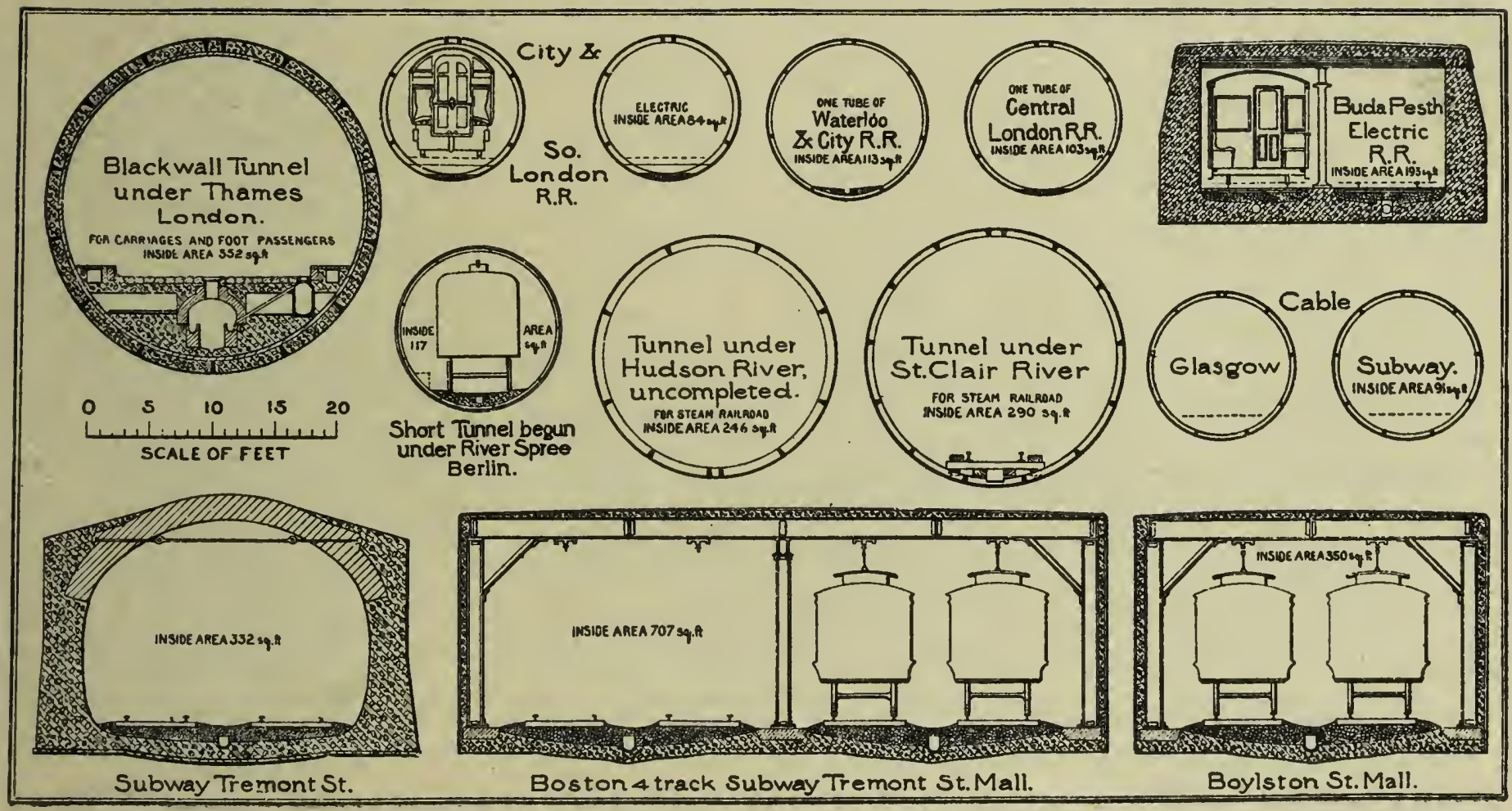
Section 4—From the corner of Boylston and Tremont streets to Warrenton street, under Tremont street (two tracks); constructed by the Metropolitan Construction Co. of Boston.

Section 5—From Warrenton street to Pleasant street (four tracks and open incline); constructed by W. H. Keyes & Co. of Boston.

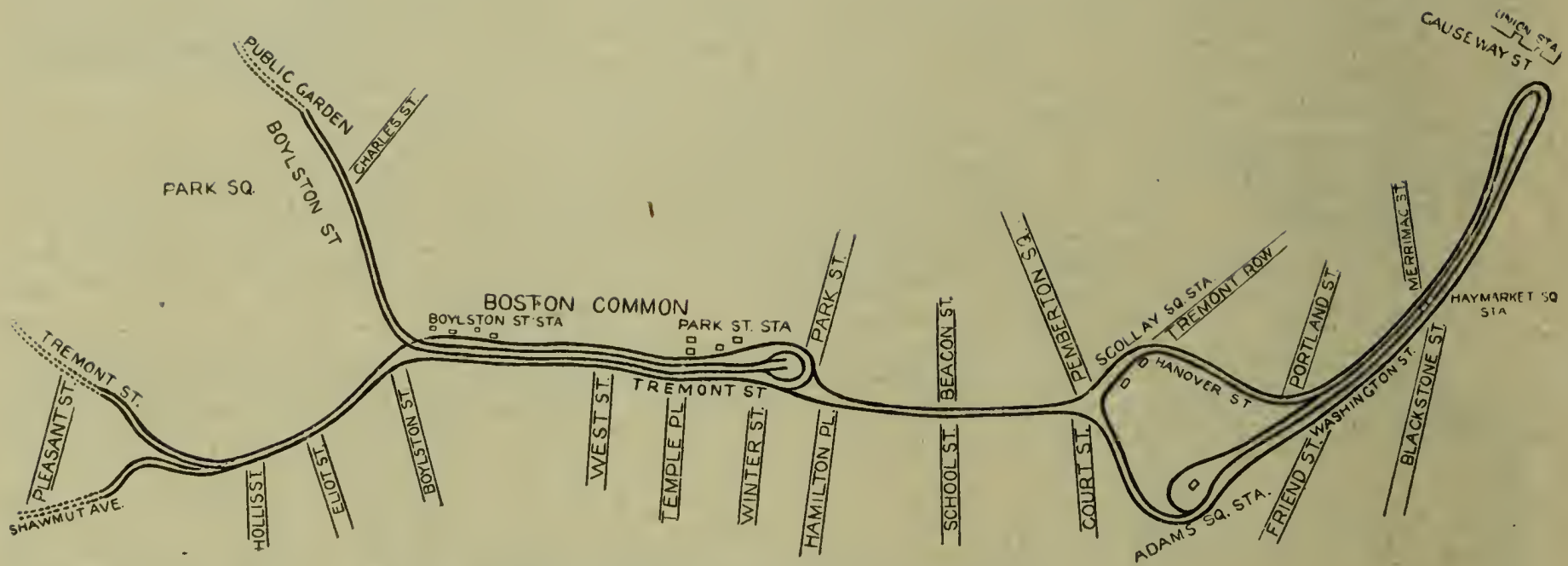
Section 6—From Park street to near Scollay square, under Tremont street (two tracks); constructed by R. A. Malone & Co. of Boston. (Malone & Co. worked about four months and this section was then completed by the Transit Commission.)

Section 7—Scollay square station; constructed by the Shailer & Schniglau Co. of Chicago.

Section 8—From Scollay square to the corner of Hanover and Washington streets, under Hanover street (two tracks); constructed by the Metropolitan Construction Co. of Boston.



RELATIVE SIZES OF VARIOUS SUBWAYS



OUTLINE MAP OF BOSTON SUBWAY.

Boston Common, Tremont and Boylston Streets, Dec. 6, 1895.

Construction of the Subway—Continued

Section 8½—From Scollay square to Adams square, under Cornhill (two tracks); constructed by the National Contracting Co. of New York.

Section 9—From Adams square to the corner of Hanover and Washington streets (station and three tracks); constructed by Richardson & Young of Chicago.

Section 10—From Hanover street to the old Boston & Maine Railroad station, Haymarket square (station and four tracks); constructed by the Shailer & Schniglau Co. of Chicago.

Section 11—From Haymarket square to Travers street (four tracks and open incline); constructed by Charles Linehan of Cambridge.

Sections 9, 10, 11—Portions nearest buildings were constructed by the Transit Commission.

Most of the Surplus Excavated Earth was loaded on the Boston & Maine Railroad gravel cars and was hauled away at night, without charge to the Transit Commission. A smaller portion of the surplus earth was used to level up some low portions of the Public Garden and Common. A still smaller portion was filled on flats in Cambridge. The remainder was disposed of at various places, such as near the South Union Station, at Russia Wharf, etc.

An Explosion Occurred resulting from a leakage of gas into an excavation between the top of the Subway and the temporary bridge upon which the street cars and other surface traffic were carried. The time was 11.46 in the forenoon, on March 4, 1897.

Six Persons Lost their Lives and four died afterwards. Several others were hurt. The Subway structure was not injured. The damage to adjacent buildings consisted principally in the breakage of glass.

Explosion, Tremont and Boylston Streets, 11.46 a. m., March 4, 1897.

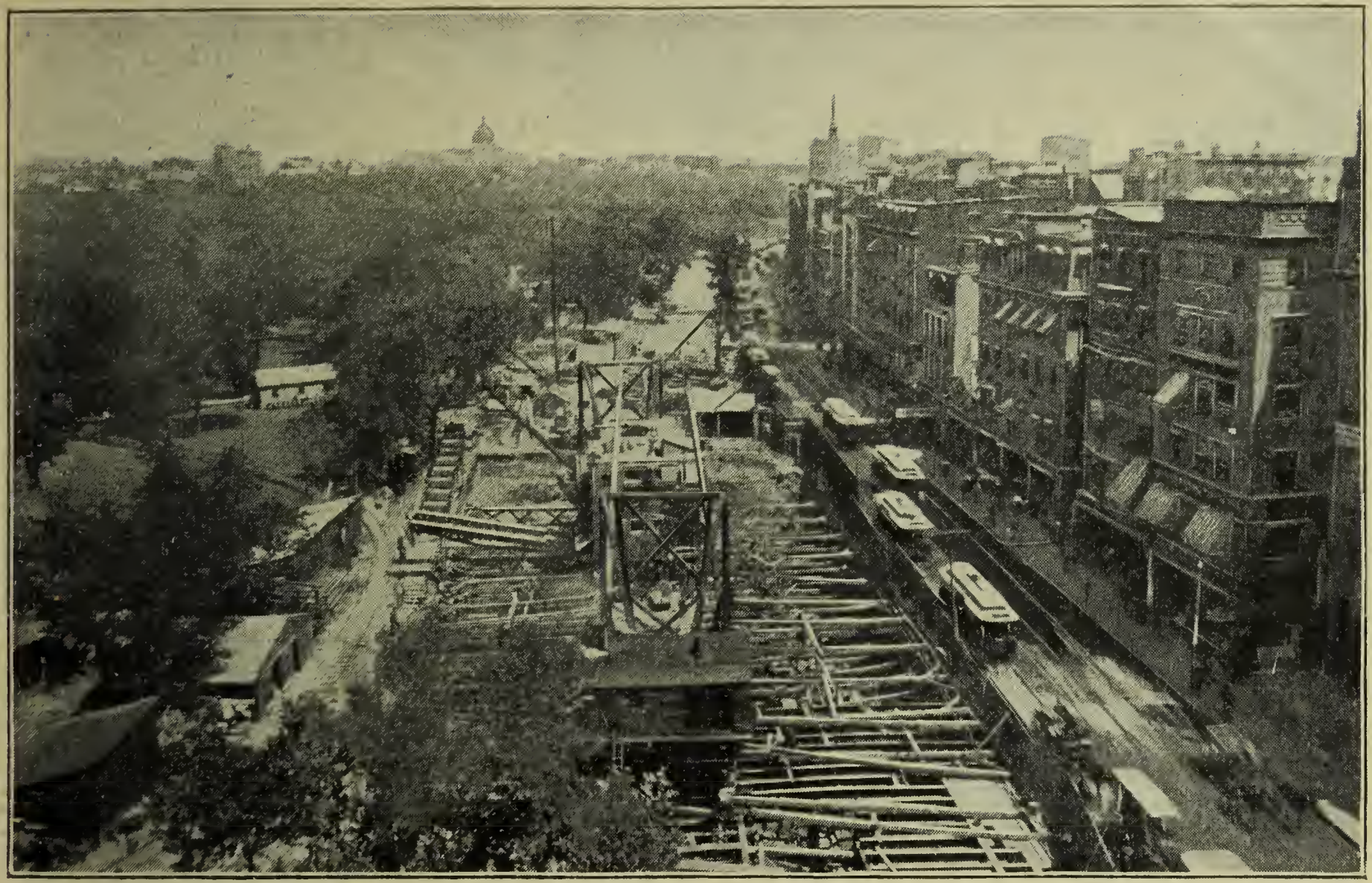
Statistics of the Subway

Length of entire Subway, about one and two-thirds miles; average height of opening, 14 feet from top of rail; width of four-track portion, 48 feet; width of two-track portion, 24 feet; miles of single track in entire Subway, five; miles of single rail in entire Subway, 10; tons of rail in entire Subway, 1102 (The rail used is that adopted by The American Society of Civil Engineers — the standard tee rail used by steam railroads. A rolled steel wheel-guard on the inside of each rail, is bolted to the rail); total weight of rail and guard, 128 pounds per yard; weight of rail exclusive of guard, 85 pounds per yard. Broken stone ballast is used.

Total Estimated Quantities in Subway: Excavation, 369,450 cubic yards; concrete, 75,660 cubic yards; brick, 11,105 cubic yards; steel, 8,105 tons; granite, 2,285 cubic yards; piles, 117,925 linear feet; ribbed tile, 12,440 square yards; plaster, 88,190 square yards; water-proofing (asphalt coating), 117,980 square yards; artificial stone, 6,790 square yards; enamelled brick, 2,210 square yards; enamelled tile, 2,855 square yards.

The Chief Engineer, Mr. Howard A. Carson, visited Europe during March, April and May, 1894, partly for personal reasons and partly to study various details relating to the work of the Subway. Engineers were interviewed and engineering objects of interest were visited in Italy, Austria, Hungary, Germany, France and Great Britain.

Resignation of Mr. Albert C. Burrage. This gentleman resigned as Commissioner owing to business engagements conflicting with his work as Commissioner. He tendered his resignation to his Honor, Lieut. Gov. Roger Wolcott, acting Governor, on November 4, 1896. On November 19, this resignation was accepted. On the same date Mr. Horace G. Allen was appointed to fill the vacancy, and on November 24 the appointment was confirmed by the Council.



Looking Northerly on Tremont Street, June 25, 1896.

Strength of the Roof of the Subway

The material used for the framework of the subway is open hearth steel made partly by the acid and partly by the basic process. The steel framework of the structure was designed to carry: (1) Its own weight, together with that of the concrete and masonry of the roof itself, and the covering of earth and paving above the same. (2) Either of the following live loads arranged in any possible position: (*a*) A steam road-roller surrounded by a crowd of people weighing 100 pounds per square foot; (*b*) As many electric cars, weighing 18 tons apiece, as could be brought over the structure in question, all intervening and surrounding space being filled with a crowd of people weighing 100 pounds per square foot; (*c*) A uniformly distributed load of 250 pounds per square foot.

The Road-roller, considered for the parts of the subway under the streets, was taken as weighing 50,000 pounds, while that used on the Public Garden and the Boylston and Tremont-street malls of the Common was assumed to weigh 36,000 pounds.

Ventilation of the Subway

Ventilating chambers have been built in connection with the Subway as follows: Two ventilating fans seven feet in diameter in front of Winthrop School yard, Tremont street, section four; one fan seven feet in diameter, Boylston-street mall of the Commom; two fans eight feet in diameter, Tremont-street mall of the Common, nearly opposite West street; two fans seven feet in diameter, King's Chapel yard; one fan seven feet in diameter, Cornhill, near Franklin avenue; one fan seven feet in diameter, Hanover street, near Marston's restaurant; two fans eight feet in diameter, northeasterly corner of Washington and Hanover streets.

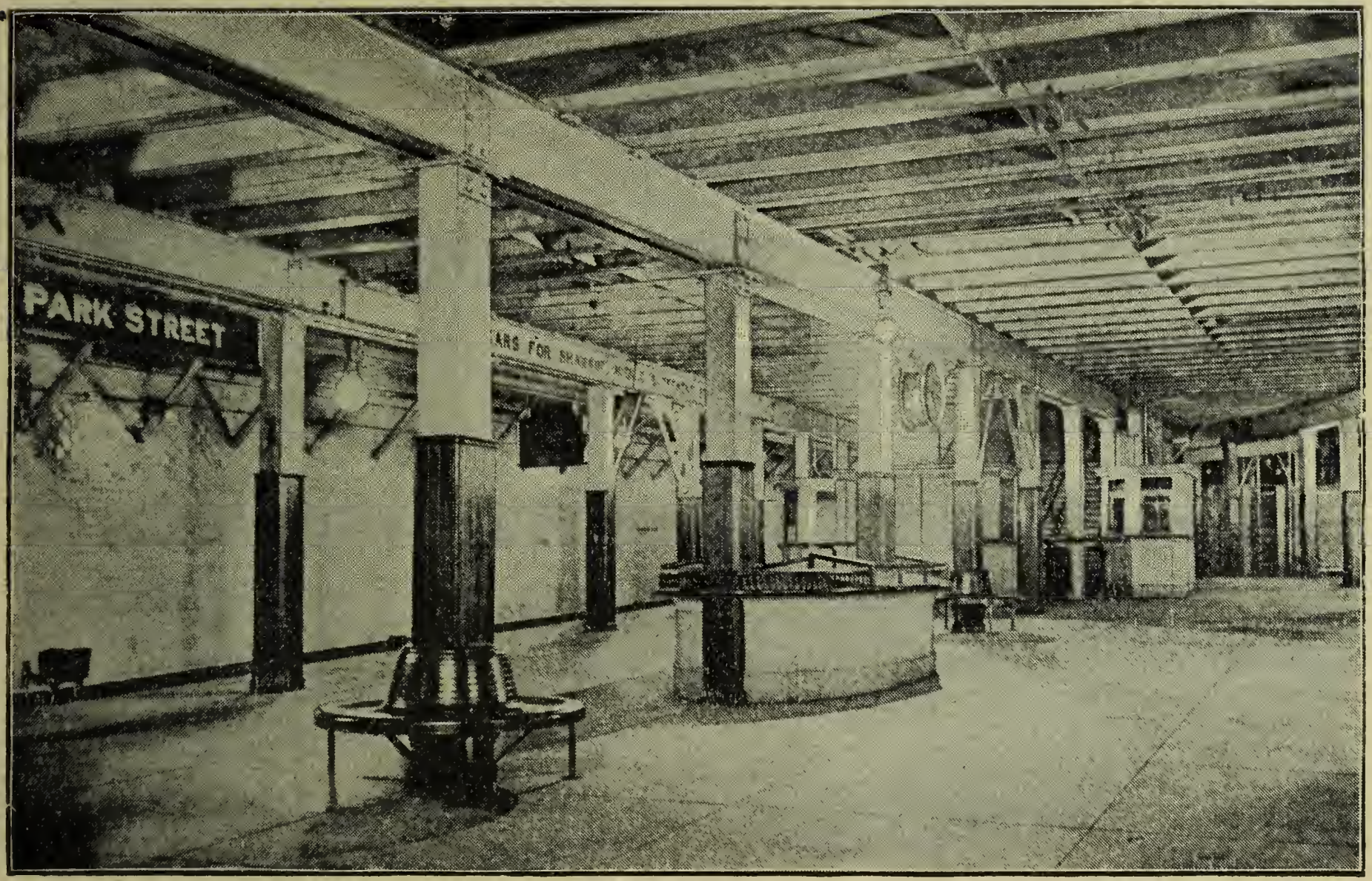
SHOWING PARK STREET GATES OF COMMON.

Stations of the Subway

The stations of the completed Subway are: (1) At the corner of Boylston and Tremont streets, (2) Park street, (3) Scollay square, (4) Adams square and (5) Haymarket square.

The Boylston-street Station contains four tracks and two island platforms of artificial stone, and two stairways lead from the surface to each platform. The structure is of the steel and masonry combined type. The walls are lined with enamelled brick. The westerly track (going southerly on Tremont street) begins at the southerly end of the south-bound platform to descend with an eight per cent grade, passes by curve under the two Boylston-street tracks, and there begins to ascend at a four-and-a-half per cent grade. There is a sub-passage six feet wide and about seven feet high, with a stairway at each end, connecting the north-bound and south-bound platforms. A conduit of concrete and brickwork, having an internal diameter of about ten feet, was built under the station, running diagonally across from Tremont street near the Tremont Theatre, for a thirty-inch and a forty-inch water pipe. The conduit terminates on each side of the Subway in a chamber about ten feet wide and eighteen feet long.

The Area of the Park-street Station is About One Acre. Its shape and dimensions were limited by a law passed to prevent undue encroachment on the Common, and in some degree by a desire so far as possible to save trees. The cost of its construction was about $350,000. The present traffic of the company indicates that during the first year of the use of the Subway as a whole the number of passengers taking and leaving the cars at this station will be at least as great as the number of passengers entering and leaving Boston by steam railroad trains at the Northern Union Station, or about 24,000,000, and also greater than the aggregate number of passengers last year entering the city by all the other steam roads which now occupy the new South Union Station.



WESTERN HALF OF PARK STREET STATION.

Stations of the Subway — Continued

In Scollay Square there is one stairway for both entrance and exit, and one for exit only. Under the requirements of Acts of 1897, chapter 500, the Scollay-square station was enlarged from its original plan by the addition of a platform on the east side one hundred and ninety-eight feet long, with an entrance and an exit at the corner of Brattle street, for which the estate at this corner was taken. This addition gives increased accommodation for the convenience of passengers at this important station.

The Eight Buildings on Boston Common over the Boylston-street and Park-street station stairways were designed by Messrs. Wheelwright & Haven, and were constructed by Messrs. Norcross Brothers. They cost, including staircases and steel above the roof of the Subway, about $11,000 each. The buildings in the centre and northerly end of Scollay square; and the one in Adams square, were designed by Charles Brigham, and were constructed by Messrs. Woodbury & Leighton. The building in the centre of Scollay square cost, including stairway, approximately $25,000, that in the northerly end about $10,000, and that in Adams square about $23,000. The building covering the two stairways in the Haymarket-square station was designed by the engineer of the Transit Commission, and cost about $7,500. The temporary building covering the entrance and exit stairway at the corner of Court and Brattle streets was also designed by the engineer. In case a large building should be placed in this locality; this structure is so arranged as to strength of foundation, of first story, and of steel skeleton, that it could be incorporated in the larger building, and made to conform to almost any style of architecture which would be adopted. Its cost, including both superstructure and stairway, was about $9,800.

STAIRWAY BUILDING, SCOLLAY SQUARE.

Equipment of Stations of the Subway

On the platform at the foot of the entrance stairways are the ticket offices, there being twenty-seven in all. These offices are lighted with incandescent lights and heated by electric heaters. On the platforms at the foot of the exit stairways are turnstiles through which exit may be made; but which bar entrance to the platforms. Emergency rooms have been built in some of the stations, into which any one taken sick or injured can be conveyed and remain until they can be removed. These rooms are equipped with a cot bed, chairs, table, etc., and are heated by electric heaters.

Each Platform is connected by telephone with the company's telephone system, and in addition a system of telephones between stations is being installed so that the station masters can communicate with each other without calling up the central exchange.

To Accommodate Traffic. The stations and stairways of the Subway are believed to be sufficient to accommodate (to a reasonable degree), the maximum traffic between the hours of four and six p. m., on week-days, and the extraordinary demands of holidays. No steam or electric railway, ferry or other public conveyance, no building, sidewalk or street, is ever planned to fully accommodate a holiday crowd. To do so, aside from its financial extravagance, would entail great inconvenience to the public in the normal use of the premises. It must be remembered that the Act provides that the Subway shall not extend under the Common more than sixty feet beyond the limit of the malls, and as a consequence, the stations have had to be made with respect to this provision.

BUILDING OVER STAIRWAYS, ADAMS SQUARE.

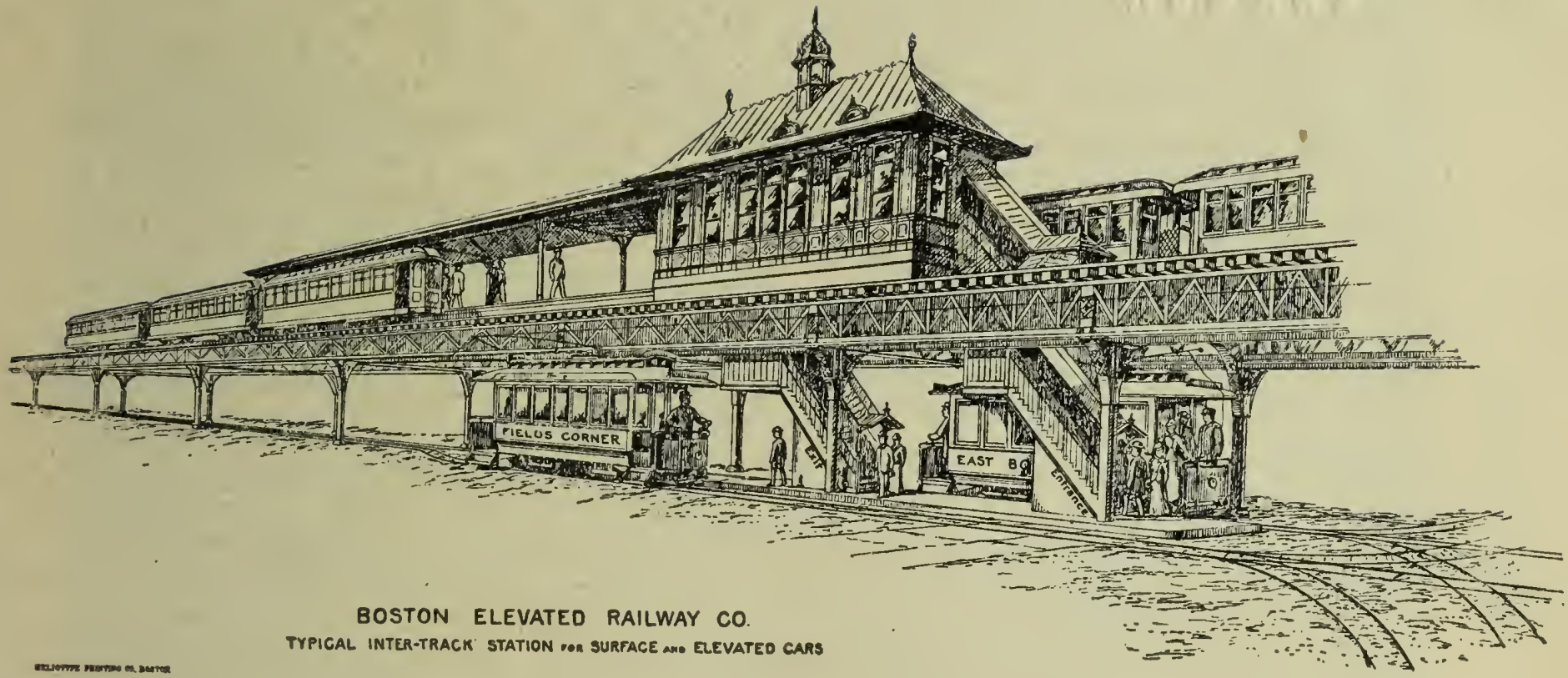
Possible Connection of Subway with Elevated Railways

As it was not thought probable by the Commission or its engineer that the traffic inside the Subway would be by other than street railway cars, and as that traffic was certain to be very large, the Subway was primarily designed for the use of such cars. The height, width and curvature of the outside tracks are, however, such as to make it possible to run thereon cars of the Manhattan Elevated Railroad type.

The Legislation of 1897 provides that under certain conditions, and upon request of the Boston Elevated Railway Company, the Boston Transit Commission shall make such alterations in the Subway as may be necessary to render it suitable for the running of cars and trains of cars through it in connection with the elevated structure. Under this law, an additional easterly platform has been built at the Scollay-square station, a curve on the outer track at the head of Hanover street has been changed, and a change has been made in one of the stairways at the Park-street station.

Curvature of Tracks in the Subway. The requirements of wide platforms and wide stairways, combined with the legal and other limitations, involved much curvature of tracks; and to avoid injury to private property near Hotel Pelham, and near Park-street Church, in passing from the Common to the street, it was necessary to add still further to the curvature.

The Ascents and Curves are not more pronounced than those shown on the plans at the Legislative hearings preceding the passage of the law creating the Boston Transit Commission, and are exceeded in numberless cases on electric surface railways in almost all parts of the country.



BOSTON ELEVATED RAILWAY CO.

TYPICAL INTER-TRACK STATION FOR SURFACE AND ELEVATED CARS

HELIOTYPE PRINTING CO. BOSTON

PROPOSED ROUTE OF ELEVATED STRUCTURE.

BUILDING OVER STAIRWAYS, HAYMARKET SQUARE.

Disposal of Rain Water Entering Inclines of the Subway

The rain water which enters the Subway from the open inclines is, together with a small amount of leakage, lifted from twelve to eighteen feet by automatic electric pumps and emptied into the city sewers. The Subway has a pump-well in the Public Garden, at Eliot street, Adams square, and Haymarket square. In each chamber above the pumps are two electric motors which operate them.

Very Little Dampness, except from atmospheric condensation, is to be found on interior walls or roof of the Subway, although numerous discolored patches, caused by dampness and dust, can be seen on the walls of sections 4 and 6. Most all of the leakage comes through the small drains in the invert leading from hollows left in the sidewalk. Careful measurement was taken at the end of an unusually wet season, and the actual amount of leakage for the entire Subway was found to be about eighty-one gallons per minute. About eight gallons per minute of this flows by gravity into the Brattle-street sewer. The work (theoretical) of pumping the remainder is less than one-fourth horsepower.

A Tunnel to East Boston is required to be constructed by the Transit Commission, when the Elevated Company is authorized to begin the construction of its road. The Chief Engineer estimated the cost of building the tunnel from a convenient point near Hanover street in Boston, to Maverick square in East Boston (at $2,406,600).

Elevators. The Boston Subway is not equipped with elevators, because the height to be traversed is so small. The reason that the Subways in London and elsewhere have elevators is on account of the great depth of these subways below the surface.

TREMONT STREET, LOOKING TOWARD PARK STREET CHURCH, NOV. 27, 1896.

The Principal Provisions of the Contract are:

The Grant. There is granted to the West End Street Railway Company, subject to certain restrictions and limitations, the entire use and occupation of the Subway, constructed, and to be constructed, under the Subway Acts, the same to be used only for location of the railway tracks of said Company, and for the operation of its railway, and for certain cognate purposes expressly enumerated in the contract.

Use of Tracks. The Company may permit the use of its tracks to any street railway now using and entitled by virtue of an existing contract, to use its tracks.

Assignment of Contract. The Company may assign its rights, privileges, and powers under the contract to any corporation having the right to carry passengers in the City of Boston which by authority of law succeeds by purchase, lease, or otherwise to the property, rights and franchises of the Company, on condition that such succeeding corporation assumes all the duties, obligations and undertakings imposed upon the Company by the contract.

The Term. The term of the Grant is for twenty years from the date when the use of any portion of the Subway begins.

The Compensation. The compensation per annum to be paid in quarterly payments is a sum equal to 4⅞ per cent of the net cost of the Subway. It is also provided that the compensation for any quarter of a year after the Company shall have acquired the use of all portions of the Subway shall not be less than the sum computed by charging a toll of five cents for each passage through the Subway, of a car not exceeding twenty-five feet in body length, and a proportionately greater charge for cars of greater length, it being understood that any car which enters or passes through the Subway or a portion thereof in one direction and then reverses its direction within the Subway and makes a round trip is to be considered as making two passages.

HAYMARKET SQUARE. OLD BOSTON & MAINE DEPOT, MARCH 19, 1896.

The Principal Provisions of the Contract—Continued

Equipment. The Company is required to equip the Subway with tracks, wires, appliances, fixtures, machinery, furniture and apparatus adapted thereto and necessary for the convenient maintenance and operation of a railway therein, and for the safety and accommodation of the passengers upon said railway.

Power. The power to be used for the operation of the railway within the Subway and of all apparatus placed therein is limited to electricity, compressed air, or some agent, the use of which will not be accompanied by smoke, steam or noxious products. The use of steam or animals within the Subway as a motive power, except temporarily in case of emergency is prohibited.

Light. The Company is required suitably and adequately and to the satisfaction of the Commission to light the Subway and the cars running therein, by electricity or such other non-explosive illuminant as may be approved by the Commission.

Repairs. The Company is required to maintain the Subway in good condition, and to make all repairs necessary therefor at its sole cost and expense, except such repairs as are made necessary by the act of God, public enemies, mobs, riots, the falling or settling of buildings, bursting of pipes outside of the Subway, explosions of gas, or works of excavations carried on or permitted by the City or other public authority, or by the location, maintenance, or use of such wires or other appliances as the City, under a reserved right, may maintain in the Subway.

Sanitary Requirements. The Company agrees to keep the Subway clean, dry, pure and in good condition, and the stations and the approaches free from ice and snow.

TREMONT STREET, WITHOUT CAR TRACKS, LOOKING NORTH.

The Principal Provisions of the Contract — Continued

Advertisements and Booths. Advertising within the Subway on the walls or otherwise is prohibited; but the Company is permitted to place and maintain booths of suitable size and character upon each platform for the sale of newspapers, magazines, periodicals and books, so far as the Commission has the power to make such grant.

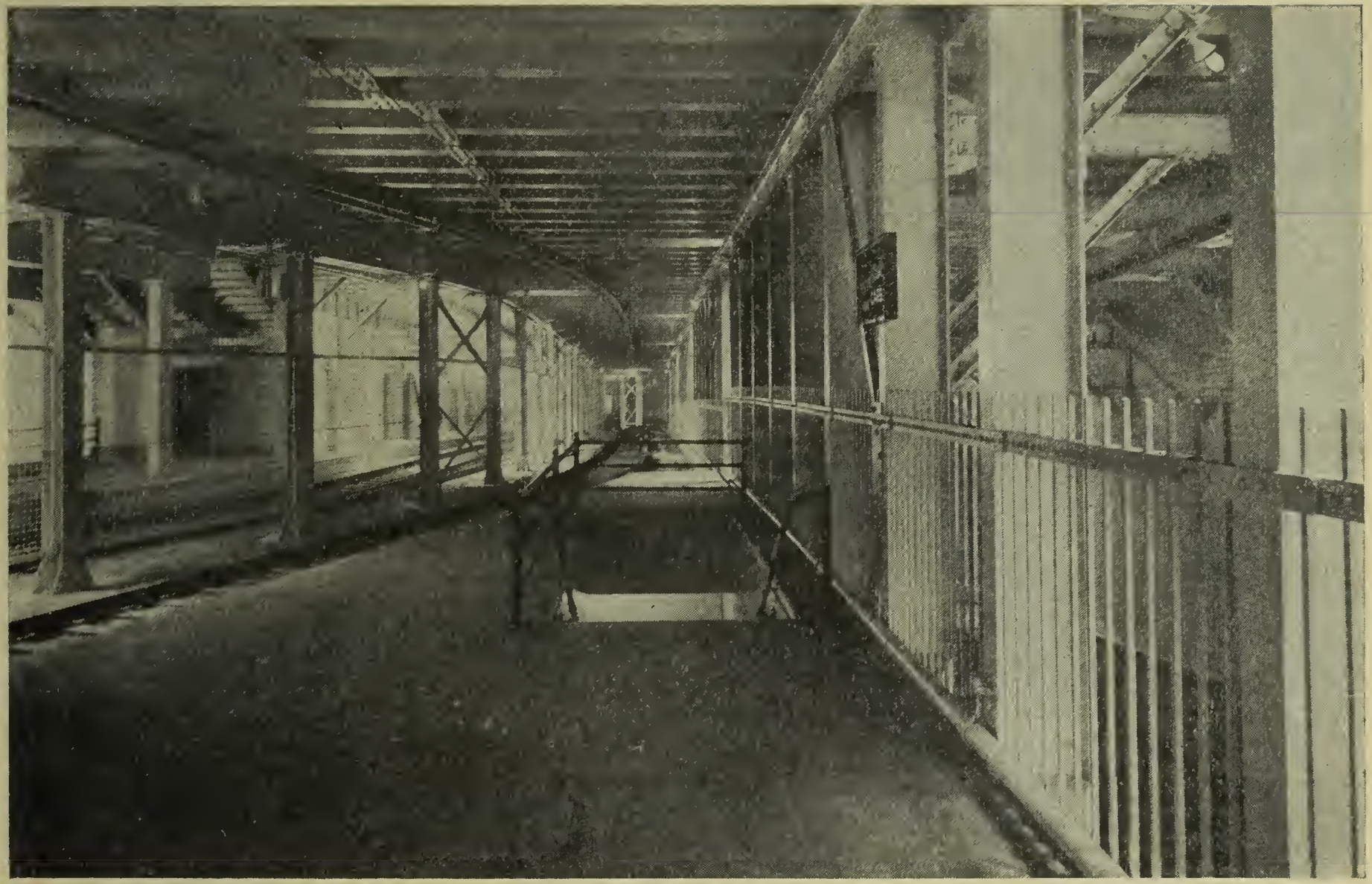
Liability for Damages. The Company, after the use of the Subway by it has begun, assumes all liability for damages of any description resulting from defects in the Subway, whether structural or arising out of want of repair or from any cause except such as are enumerated under the head of "REPAIRS."

Changes in the Subway. Provision is made determining the conditions under which changes in the Subway may be made by the Company and by the Commission.

Wires, Conduits and Tubes. The right is reserved to the City to place in the Subway such wires and apparatus as may be necessary for its police and fire alarm service, and the Company has power, under certain limitations, to grant to any person or corporation authorized by law the right to use and maintain for purposes other than railway business, wires, conduits for wires and pneumatic tubes within the Subway.

Provision for Future Action

The Board of Railroad Commissioners is constituted the authority, after the termination of the existence of the Transit Commission and until some other tribunal shall be designated by law for such purpose, to take action in sundry matters arising under the contract.



ENTRANCE TO FOOT PASSAGE UNDER TRACKS, BOYLSTON STREET STATION.

Occupation of the Subway

First Car (for construction purposes) entered the Subway May 13, 1897. First passenger car entered the Subway (with passengers) July 3, 1897.

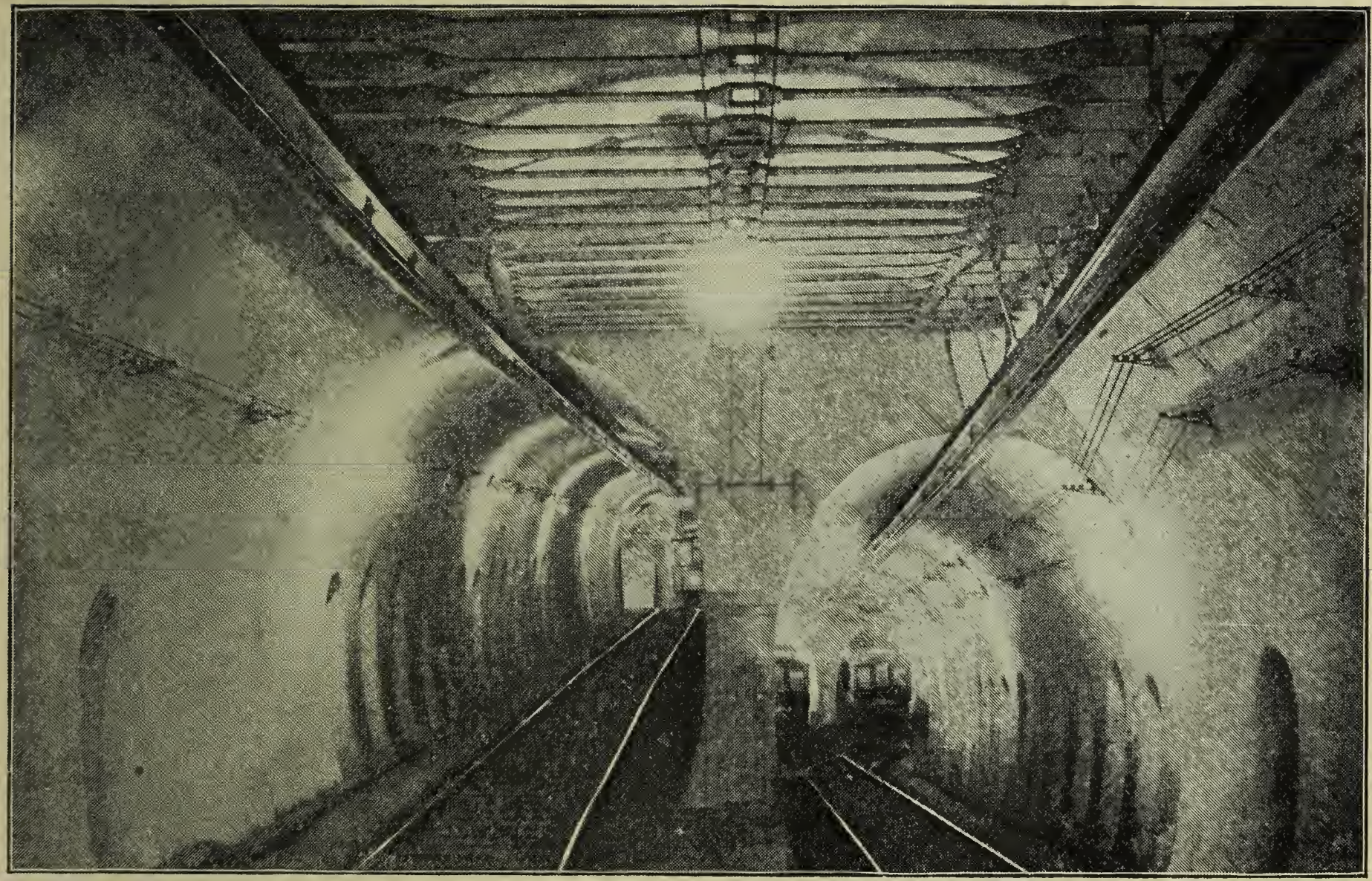
First Portion of the Subway (consisting of sections 1, 2 and 3, from the Public Garden to Park street) opened for public use September 1, 1897.

First Car (open car No. 1752 of the Allston, via Pearl street, Cambridge line) entered at 6.02 A.M.; conductor, Gilman T. Trufant; assistant conductor, D. R. Murray; motorman, James Reed. Number of fares collected on this car, 119; estimated number of passengers on the car, 150; seating capacity of car, 40 persons.

The First Passenger Car to make a special trip over the entire trackage of the Subway was car No. 2256, and was in charge of Conductor George Harriman and Motorman William S. Connell, which, on August 19, 1898, carried a party of delegates to the annual convention of the Society for the Promotion of Engineering Education, then being held in Boston.

Contract for the Use of the Subway

The contract for the use of the Subway was duly executed on December 7, 1896, between the West End Street Railway Company and the City of Boston, and was approved by the Board of Railroad Commissioners, on January 1, 1897.



Bell Mouths near Hollis Street, under Tremont Street, looking Southerly.

Miscellaneous Data

Length of Portion Opened September 1, 1897, 2,888 feet; opened September 30, 1897, 1,385 feet; opened September 3, 1898, 4,600 feet.

One Hundred and Seventy-six Cars an Hour pass through the Public Garden and Park street section, and the Transit Commission figure that the number of cars per hour can still be greatly increased without inconvenience.

The Total Number of Passengers Carried during the eleven months ending August 1, 1898, was over 13,000,000, being at the rate of about 14,500,000 a year. This was the traffic when less than one half of the entire Subway was in use, and before all the surface lines for that half had been transferred to it.

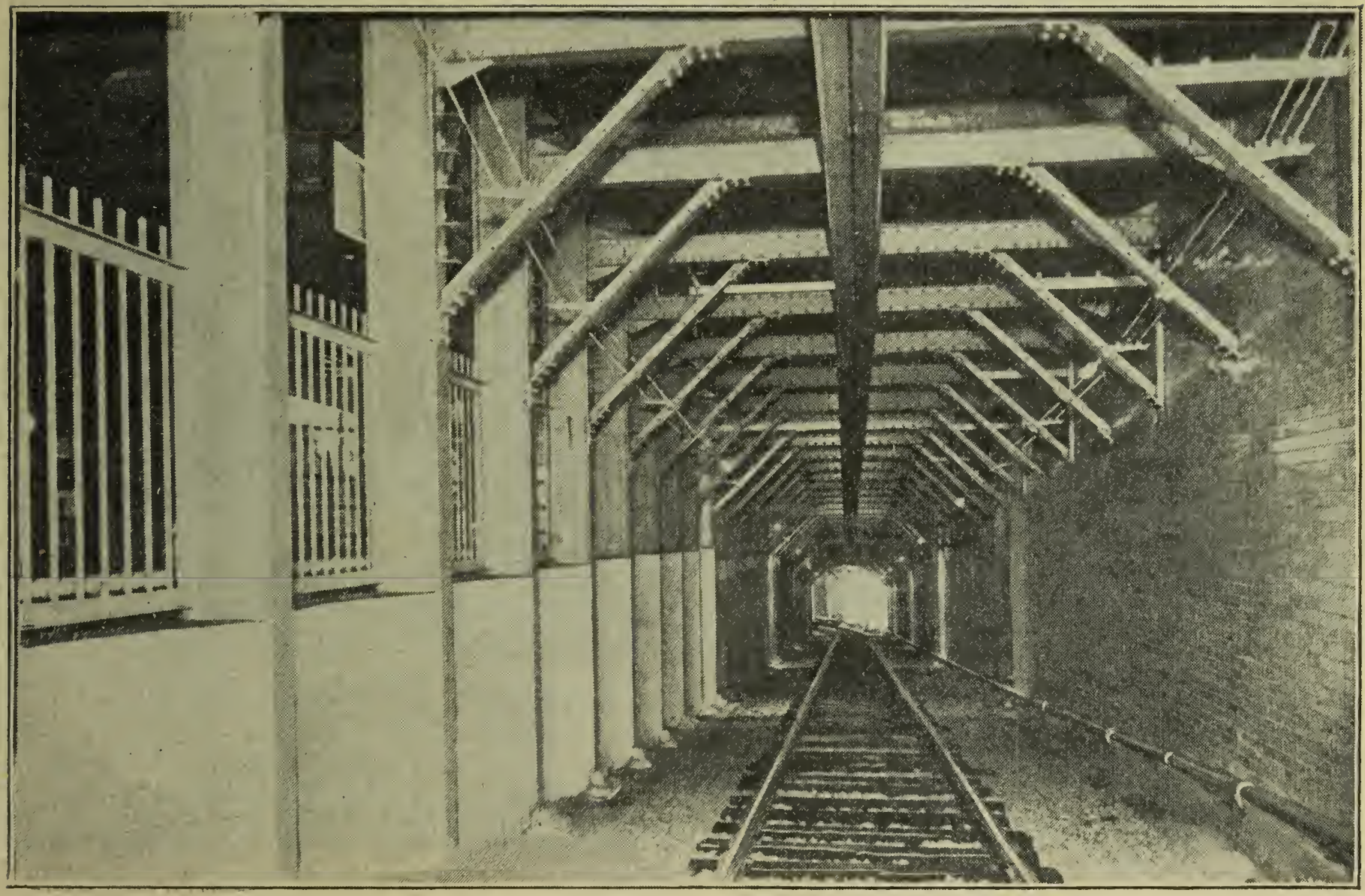
Since the First Car Entered the Subway the service has been uninterrupted, and without serious injury to passenger or employee.

Seventy-one Lines of Cars of the Boston Elevated Railway Company and five lines run by the Lynn & Boston Railroad, making a total of seventy-six distinct lines of cars, are included in the Subway district.

The Stations are Lighted by Arc Lights; between stations, incandescent lamps are used. In the entire Subway there are about 4,800 incandescent lamps.

The Subway on Tremont Street, south of Boylston street, and north of Park street, is oval, or what is commonly called "barrel-shaped."

A Cat Born in the Subway December 13, 1896, was named "Prince Subway," and was the first to ride through the tunnel, July 3, 1897.



SHOWING PORTION OF SUB-SUBWAY.

Miscellaneous Data—Continued

Five Men (four laborers and one carpenter) lost their lives on the work of construction of the Subway; another laborer lost an eye. No loss of limb is known to have occurred.

No Large Dogs are allowed in the Subway; small dogs, carried in the arms, are allowed.

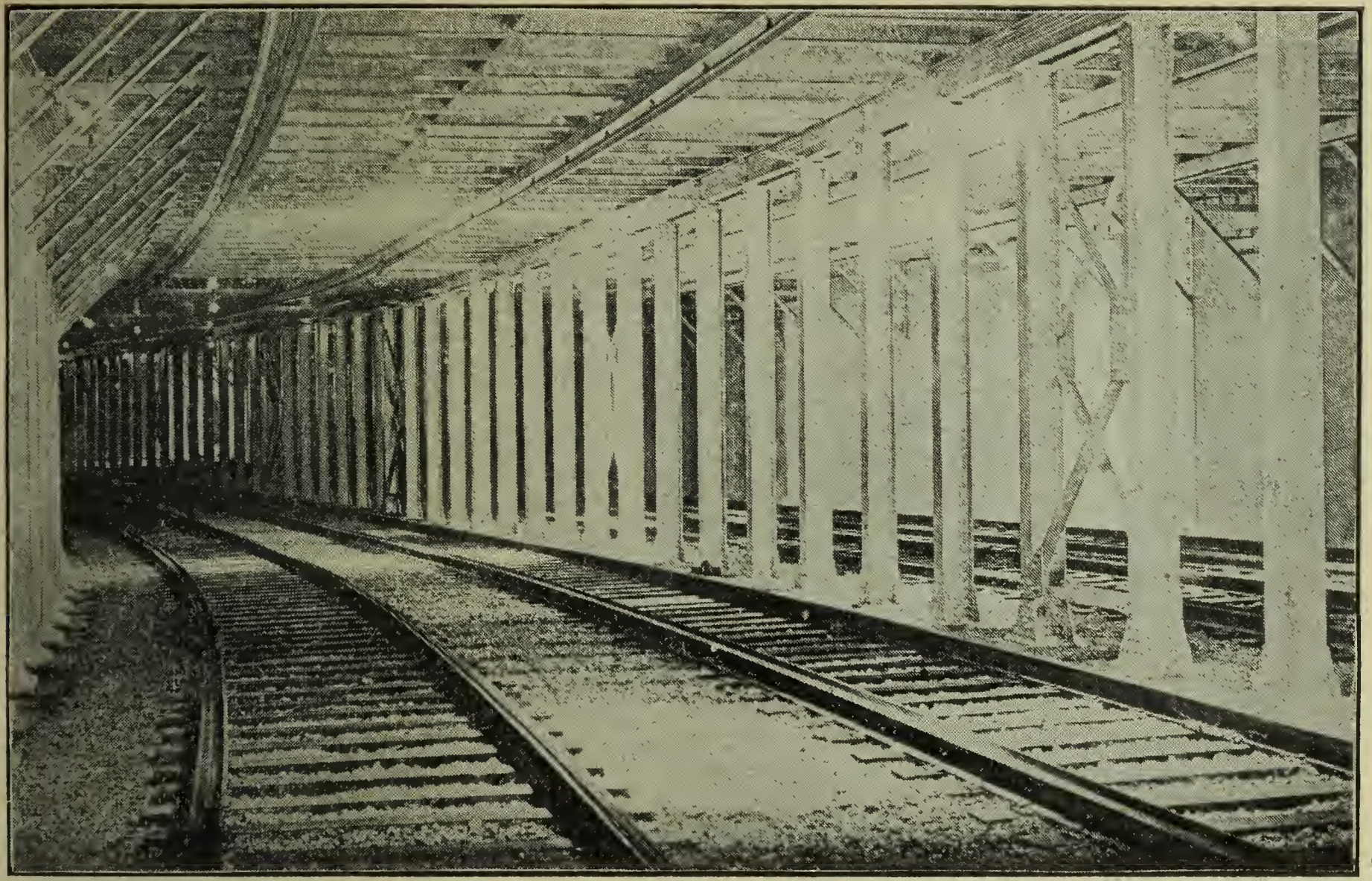
$750,000 was Awarded the Boston & Maine Railroad Company on January 8, 1895, as damages for the property the Commission had taken belonging to that company. This refers to the old Boston & Maine station, etc.

During the Excavations for the Subway the following substances were met with:—Loam, peat, clay, ashes, gravel, sand, and oyster shells.

Twelve Tomb Stones and one Human Skeleton were unearthed about seventy to eighty feet west of Tremont street, between the northerly line of Winter street and Park street. The stones were lying in a horizontal position, about four feet below the surface (none being near the skeleton), and bear the following names and dates;—Edward Porter, July 29, 1677; Ann Gellum, November 11, 1678; Seth Baker, July 13, 1697; Joseph Simpson, March 12, 1708 or 1709; William Cole, April 13, 1710; Edward Mortimer, December 9, 1678; Precilla Mann, September 21, 1716; John Endicott, August 22, 1686, Rebecca Cossen, November 24, 1721; Children of Rowley, 1680; John Smith; John Wakefield, August 11, 1715.

These Tomb Stones are carefully preserved.

Burial Grounds. On the route of the Subway there are three burial grounds, namely:—the Common Burial Ground, the Granary Burial Ground and the King's Chapel Burial Ground.



FOUR TRACK PORTION OF SUBWAY. WIDTH, FORTY-EIGHT FEET.

Open Incline (Subway) to North Union Station.

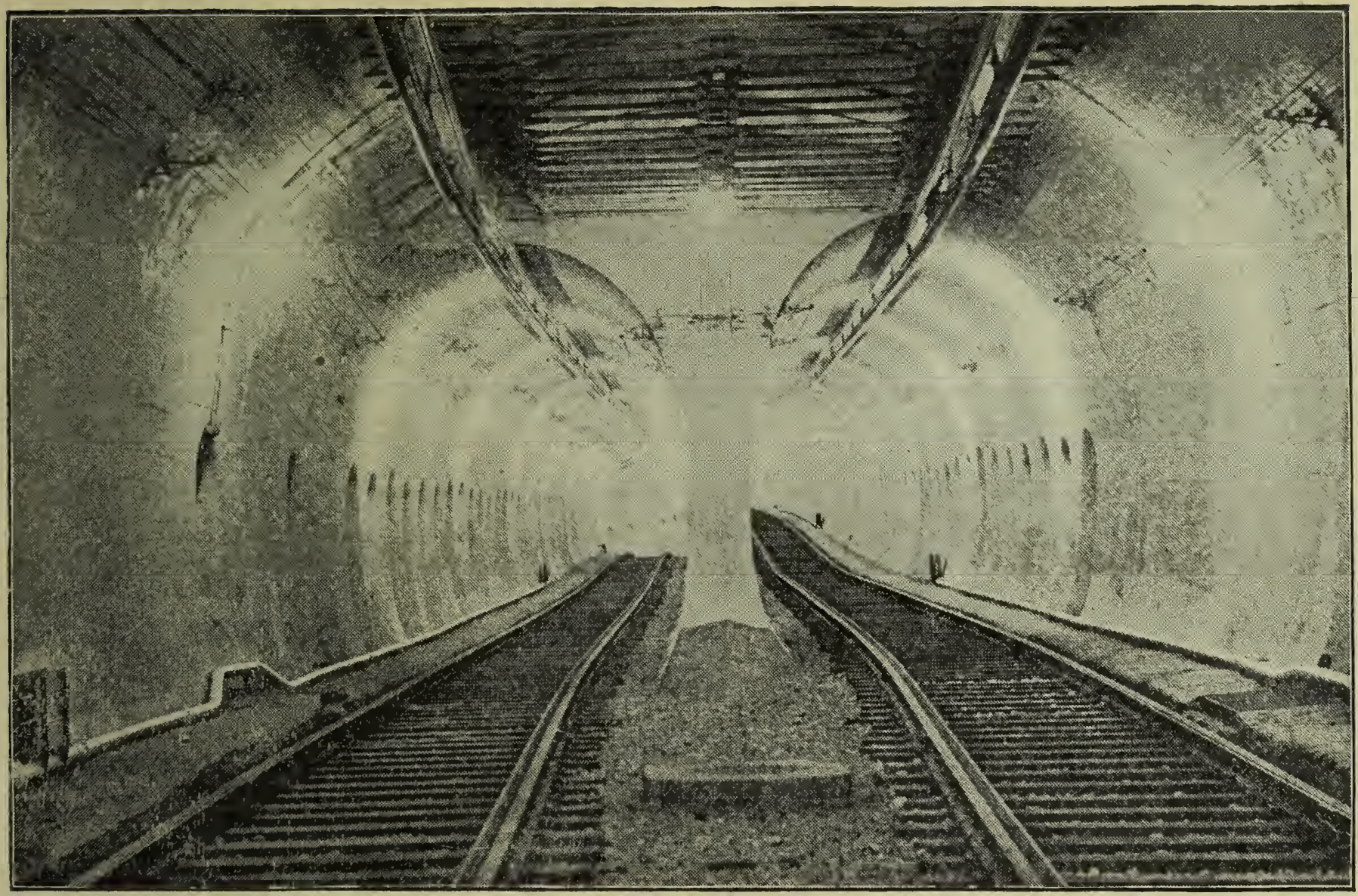
LOOP OPPOSITE NORTH UNION STATION, LOOKING SOUTHERLY.

Power Stations

A slight description of the power stations of the Boston Elevated Railway Company, especially those that usually supply the Subway with light and power, may be of interest. At present the company has seven power stations, the normal capacity and location of each being as follows:

NAME.	Normal Kilowatts.	Normal Horsepower.	LOCATION.
Central Power Station	15,100	21,300	439 Albany Street, Boston
Dorchester	2,000	3,000	Freeport Street, Dorchester
East Cambridge	3,150	3,900	North Street, Cambridge
Harvard	3,600	5,400	Boylston Street, Cambridge
Charlestown	1,600	2,000	George Street, Charlestown
Allston	744	1,000	Braintree Street, Allston
East Boston	600	1,050	Eagle Street, East Boston

With the exception of East Boston, which is located on an island, the stations are all connected by feeders, and by closing or opening switches the various stations can be run multiple with, or independent of, each other.



LOOKING NORTHERLY, SECTION FOUR. BELL MOUTHS.

Human Remains found

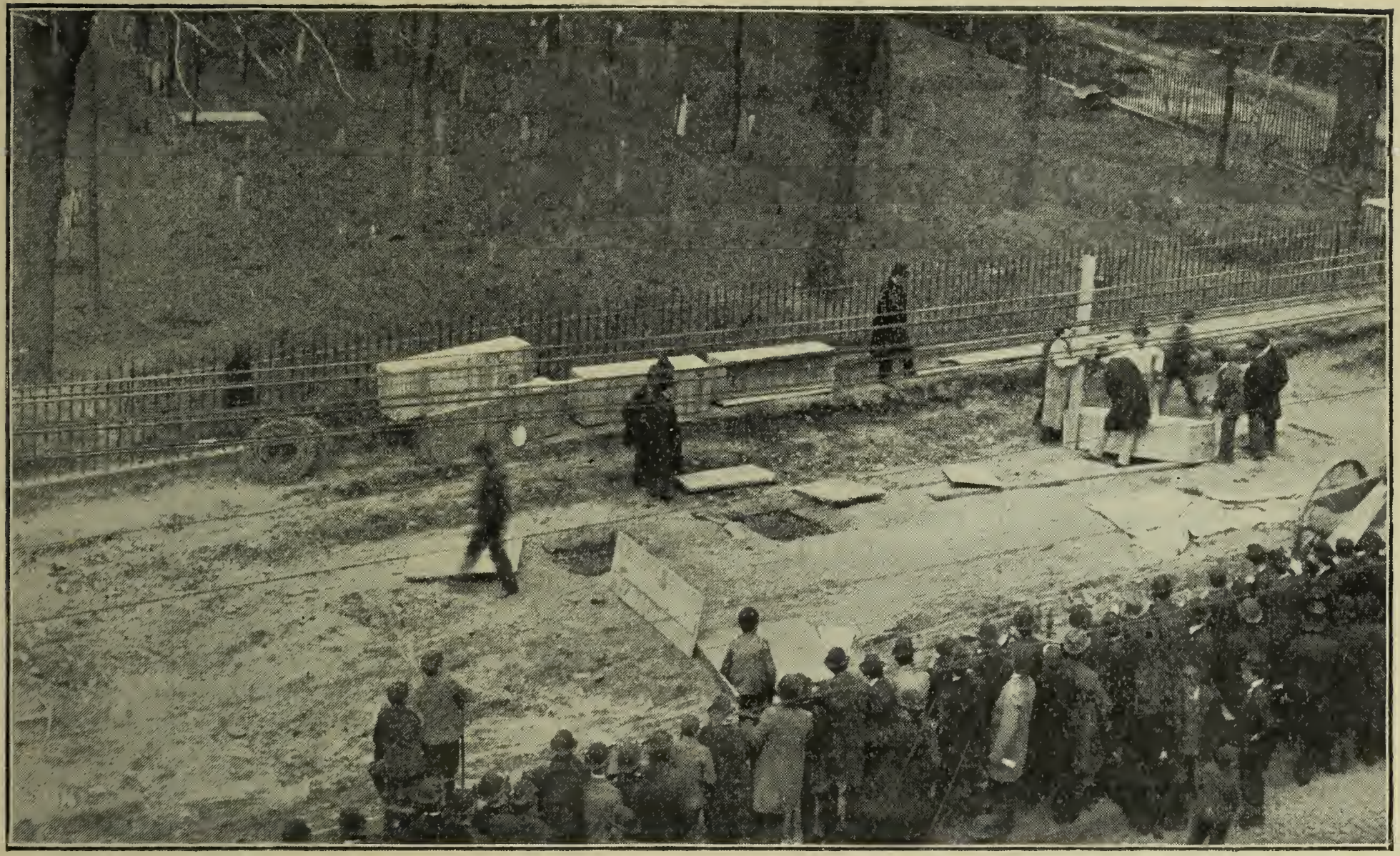
Anticipating that human remains would be found in making the Subway excavations under the Boylston-street mall, the services of Dr. Samuel A. Green, formerly Mayor of the city were secured on December 1, 1894, to make report as to the proper method to be adopted in removing and re-interring the remains. Dr. Green issued a report in writing, on December 20, 1894.

The First Remains Found in excavating were on Boylston street, April 18, 1895, and in all, 910 bodies were dug up and re-interred, and a tablet bearing this inscription was placed above them: —

"HERE WERE INTERRED
THE REMAINS OF PERSONS FOUND UNDER THE BOYLSTON STREET MALL
DURING THE DIGGING OF THE SUBWAY, 1895."

Inscriptions on Tombs and Coffins, so far as legible, found under the Boylston-street mall of the common: —

James T. Blanchard, Died Oct. 6, 1832. AE. 5 years.	Mrs. Sarah Blanchard.	James Blanchard, ...



REMOVING HUMAN REMAINS. BOSTON COMMON.

Inscriptions on Tombs and Coffins

Solomon Hawes,
Died Jan. 30, 1834.
. . . . . .
Emmaline Evans,
Died Oct. 1, . . .
. . . . . .
Gideon Williams,
Born Aug. 12, 1746.
Died Jan. 23, 1830.
. . . . Tileston,
. . . . . .
. . . . . .
Manshu Tucker,
Died Oct. 11th, 1800.
. . . . . .
Nathaniel Waer, Junr.,
Died Nov. 16th, 1823.
Age 25 yrs.
Charles H. Locke.

Zeal Skidmore,
Died Feb. 7, 1827.
AE. 49 years.
Jane Hodgkins,
Obt. Sept. 20, 1821.
Aet. 54 years.
Mary Parsons Haven,
Died Oct. 20, 1827.
AE. 21 yrs.
Samuel Morse,
Died Jan. 4th, 1826.
Age 56 years.
Araon Dexter,
. . . . . .
. . . . . .
Mr. Willima Homer,
Died Augt. 22d, 1822.
Age 52 yrs.

Homer Evans,
. . . . . .
AE. 5 mos.
Daniel Tuttle,
Died May 10, 1823.
. . . . . .
Eunice V. Fuller,
Died Oct. 11, 1826.
AE. 42 yrs.
William Keith Spence Lowell,
Died, 1823.
. . . . . .
Mr. Rufus Tower,
Died Nov. 29th, 1820.
Age 63.
Mrs. Lydia Kimball,
Died Oct. 29th, 1821.
Age 64 yrs.

Operation Subject to General Street Railway Laws

It is expressly provided that any company running cars within the Subway shall, with respect to the operation of the same, have all the powers and privileges and be subject to all the duties, liabilities, restrictions and provisions set forth in the general laws now or hereafter in force relating to street railways and in any other laws which are or may be applicable to the company so operating, so far as the same are not inconsistent with the provisions of the contract.

Removal of Surface Tracks

The Company agrees that it will make no claim against the City for damages for removing, upon the order of the Commission, its surface tracks from Tremont street between Boylston street and Scollay square, and from Boylston street between Park square and Tremont street, and such other tracks as the Commission may order to be removed under the authority of the aforesaid Acts; provided that during the term of the contract the right to lay, maintain and use tracks on the location from which the tracks are so removed be not granted nor permitted to any other person or corporation for street railway purposes. The Company agrees at its own expense to restore and leave in good condition the pavement of that portion of the streets from which the tracks are removed. The surface tracks on Tremont street from Scollay square to Boylston street, and on Boylston street from Tremont street to Park square, were removed in November, 1898.

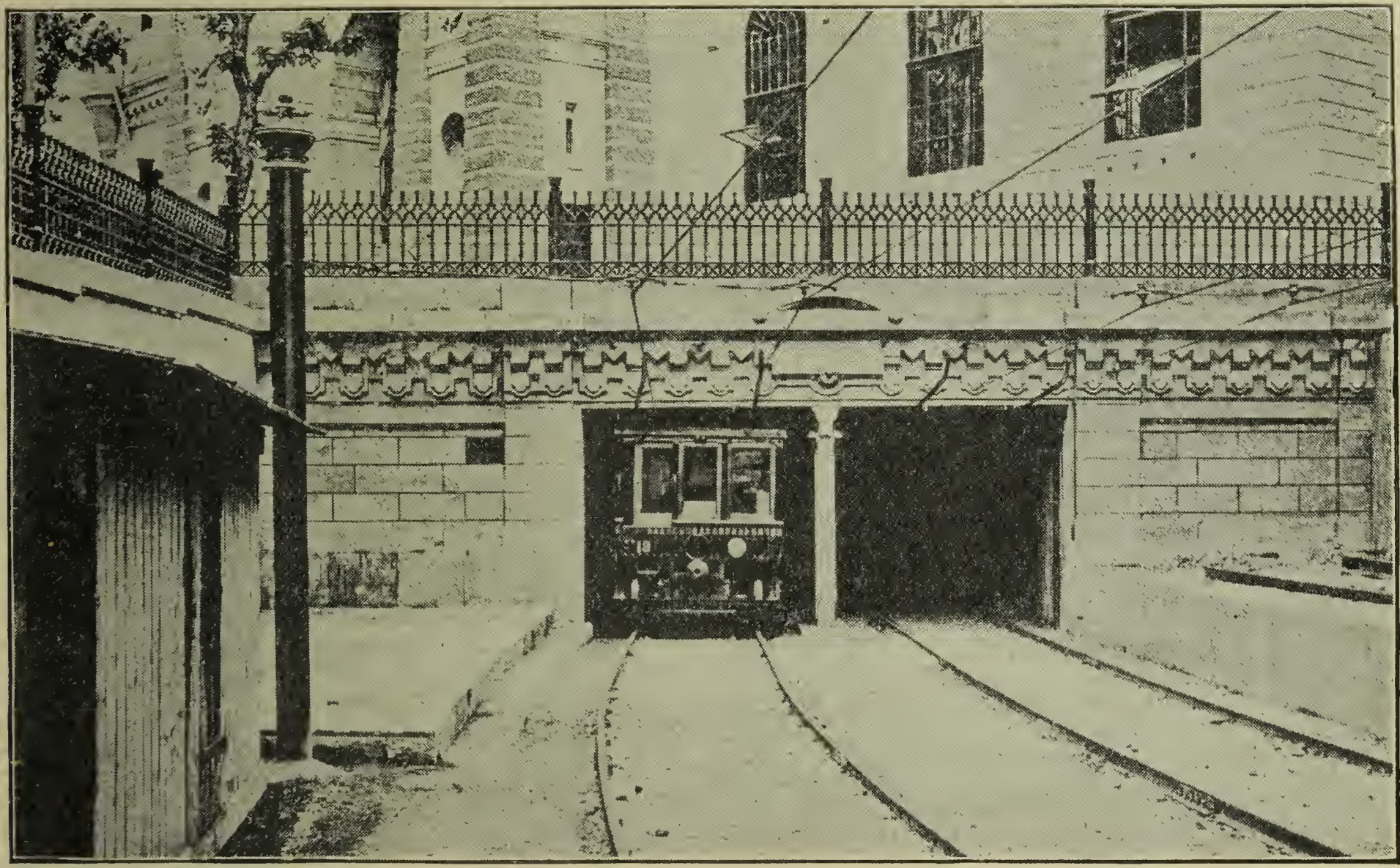
Default, Termination of Contract, and Indemnity

Under certain conditions of default on the part of the Company, the City has the right to terminate the contract and repossess itself of the Subway, and in such case the Company agrees to indemnify the City for any loss which it may in any manner sustain by reason of such termination during the residue of the term of twenty years.

The Subway was Leased to the West End Street Railway Company (Samuel Little, president) for a period of twenty years, from December 7, 1896. The Boston Elevated Railroad Company leased the West End Street Railway Company for a period of ninety-nine years, and thereby assumed control of the Subway.

The West End Street Railway, since absorbed by the Boston Elevated Railway Company, assumed, under its lease, all liability for accidents in maintaining the Subway, and agreed to pay the cost of keeping the Subway in repair.

In Commemoration of the Opening of Sections 1, 2 and 3, (from the Public Garden to Park street) a bronze tablet has been placed in the northwestern entrance to the Park street station, a reproduction of which appears on another page.



Type of Car and Subway Entrance, Budapest, Hungary.

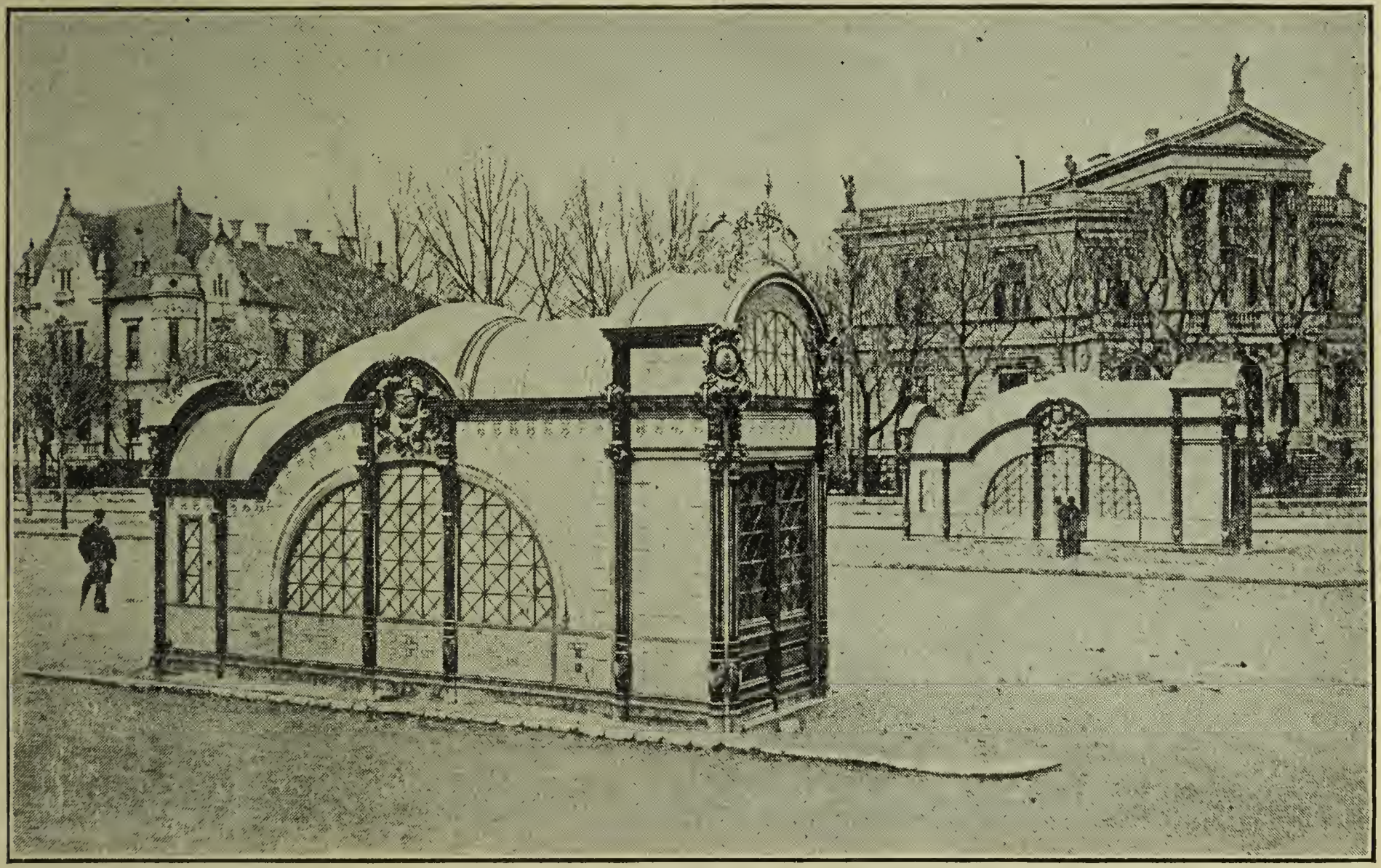
Budapest Subway

Budapest has an underground electric railway about two miles in length,or a trifle longer than the Boston Subway. It passes under Andrassy street—one of the finest streets in the world—and under other important streets. Work was begun on it in 1894 and it was finished in the early part of 1896. This is a double-track Subway with a cross section much smaller than that of the double-track portion of the Boston Subway. The construction of the roof, which lies very close to the surface of the street, is similar to that used on a considerable portion of the Boston Subway.

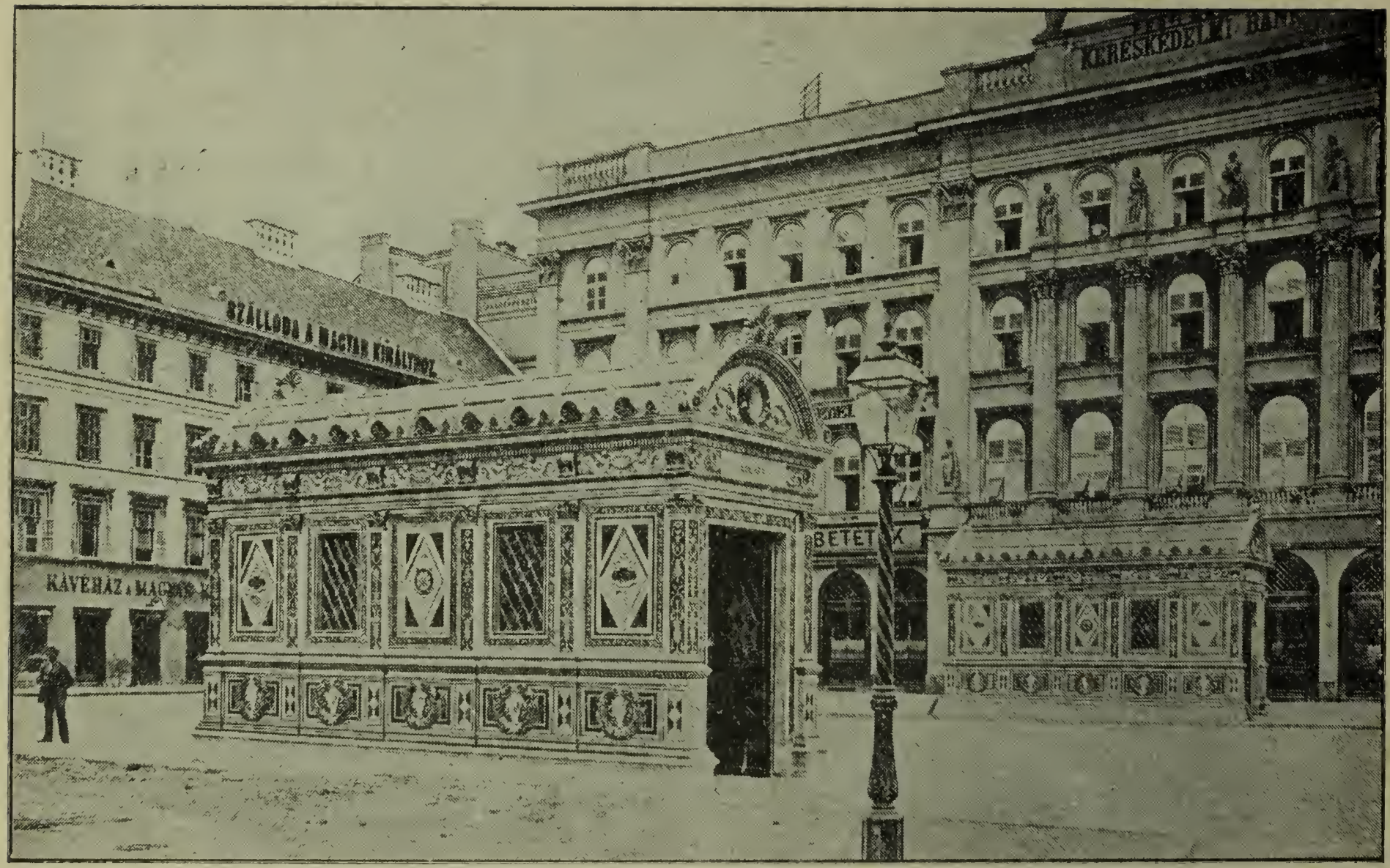
Several Views of the Budapest Subway and its Stairway Buildings on the street surface are shown elsewhere in this book and special attention is called to the beauty of these Stairway Buildings.

The London Tunnels,

with the exception of the one constructed in 1895, are operated by steam locomotives, and are not provided with any artificial means of ventilation; consequently the air within becomes very impure. For instance, it is computed that a locomotive such as is used on the New York Elevated Railway vitiates the air as much as 25,000 people, while an ordinary locomotive vitiates the air as much as 87,000 people. It is evident that the air secured by artificial ventilation in the Boston Subway, which is lighted and operated by electricity, is necessarily pure.



BUDAPEST (SUBWAY) STAIRWAY COVERINGS TO ARENASTRASSE STATION.



Another Style of Stairway Building, Budapest Subway.